Ethernet Extension Experts

Enable-IT 864
Ethernet Extender DSLAM
User Manual

ENABLE-IT

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ABOUT THIS GUIDE

This guide provides all the information needed to install and use the Enable-IT 864 ETHERNET EXTENDER DSLAM. This guide is intended for use by technicians who are responsible for installing and setting up network equipment. Consequently, it is assumed that the installer has a basic working knowledge of LANs (Local Area Networks) and voice telecom wiring.

If the information in the release notes that are shipped with your product differs from the information in this guide, follow the instructions in the release notes.

Most user guides and release notes are available in Adobe Acrobat

Reader Portable Document Format (PDF) or HTML on the Enable-IT World Wide Web site: http://www.ethernetextender.com/manuals/864 Manual.pdf

INTRODUCING THE 864 ETHERNET EXTENDER DSLAM

Congratulations on purchasing the Enable-IT's 864 ETHERNET EXTENDER DSLAM — the simplest method to stretch your broadband solutions for in-building deployment in commercial office buildings, hotels, and multi-tenant residential units.

The 864 Extended Ethernet Unit offers the Lowest Cost Solution in a simple design for rapid install using existing 1 pair Telco wiring.

This chapter contains introductory information about The 864 Extended Ethernet Unit and how it can be used in your network. It covers the following topics:

- About the 864 Extended Ethernet Unit
- Key Benefits
- Summary of Features
- Typical Applications

About the 864 Extended Ethernet DSLAM

The 864 Extended Ethernet DSLAM solves the problem of high costs associated with stretching your backbone with traditional fiber or a series of hubs/repeaters.

In many office buildings, preferred network access is a dedicated Ethernet line, however Ethernet over twisted pair wiring has its distance limitations of just 328 ft. In order to drive Ethernet signal further, one would have to add repeaters to each segment of 328ft twisted pair cabling; this is often insufficient and to costly in multi-story buildings. Fortunately, the Enable-IT 864 Series Extended Ethernet can push the reach of Ethernet to more than (20) twenty times the typical Ethernet distance over a 1-pair Telco wiring infrastructure or better.
A simple design methodology would be to think of the 864 extending a standard Ethernet line up to 6,000 (1,828m) with a (4) Port 10/100 Ethernet switch and can also include dual voice lines simultaneously.

To increase the durability and extended use of the product providing maximum future technology protection, 864 Extended Ethernet Unit meets the challenge of modern switched LANs and allows you to add features and capacity as your network expands. The Enable-IT 864 Extended Ethernet has been tested to provide full duplex transport up to 90MB/s over CAT2, and up to 100MB/s over CAT5e cabling.

Unit Model	Wiring	LAN Data Rate	Max. Distance
864	(1) pair CAT 2 up to CAT5e	100Mbps FD	6,000ft / 1,828m

Up to 700ft (200m) - 100Mbps
700ft (200m) to 1,350ft (400m) - 90Mbps
1,350ft (400m) to 1,970ft (600m) - 70Mbps
1,970ft (600m) to 2,625ft (800m) - 52Mbps
2,625ft (800m) to 3,280ft (1000m) - 42Mbps
3,300ft (1005m) to 6,000(1,828m) - 30Mbps

* Actual data rate will vary on the quality of the copper wire, twisted pair and environmental factors

Key Benefits

The following list identifies the 864 Extended Ethernet Unit key benefits.

- Dramatic cost reduction over any competing technology and includes a (4) Port 10/100 LAN switch on each end.
- Broadband technology that delivers in-building Ethernet access over 1 pair of existing Category 2 up to Category 5e wiring up to 6,000', whether spare or actively in use for analog or digital voice. This means no new wiring is required.
- Provides one scalable infrastructure for Internet access, POTS, VoIP, video, and virtual private networking.
- Rapid installation with small box profile, no programming and no firmware to upgrade.
- Low profile box with Ethernet data all in a single RJ-45 Ethernet jack (Interlink port).
- Quad switched LAN RJ-45 10/100 Ethernet ports for expansion without adding a hub or switch on each end.

Summary of Features

The Enable-864 Extended Ethernet DSLAM has the following hardware features:

- Extended Ethernet line over existing CAT 2 up to CAT5e / CAT6 wiring
- Uses RJ-45 Interlink port for transport (Dual voice, 100Mbps data and PoE)
- Rapid Telco style installation – no programming required
- Supports digital VoD channels and Maintains existing telephone (lifeline POTS)
- Drives Ethernet 100 Mbps full-duplex service delivery with quad LAN switch, dual voice up to 6,000ft or 1,829m - can also transport PoE up to 1,500ft natively.
- Network Equipment independence – Transparent to protocols/applications/MAC

Specifications:

Power Indicator
100Mbps Link status/Activity
VDSL2 Link Status/Activity

Dimensions:

Height: 2.55" (65mm)
Depth: 5.5" (139.7mm)
Width: 8" (203.2mm)

Environment:

Operating temp: -49°F to 168°F (-45°to 76°C)
Storage temp: -49°F to 168°F (-45°to 76°C)
Humidity 5% to 95%, non-condensing

Functionality:

Data Rates 100Mbps Full Duplex
Full Duplex/Half Duplex status/Collisions
Protocol independent

864 Interlink port pins:

Pins 1 & 2 – Data
Pins 3 & 6 – Data
Pins 4 & 5 – PoE positive power
Pins 7 & 8 – PoE negative power

Interfaces:

(1) 12v-3.5A DC Power Adapter 2.1mm
(4) RJ-45 Interlink ports
(2) RJ-45 100MB LAN Auto negotiate

Typical Use Applications

Enable-IT 864 Extended Ethernet Units are usually installed into telephone wiring infrastructures where extension of backbone services is required and expensive fiber options are prohibitive. The 864 Extended Ethernet Units allow a standard Ethernet segment to be deployed quickly over existing 1 pair Telco Copper Wiring in combination with existing POTS voice signals. The 864 Interlink port (RJ-45 interface) carries this 1-pair signaling over the RJ-45 pins (1 & 2) - used for transport for both voice and data. If you use more than 1-pair of wiring such as a CAT5 segment, the RJ-45 pins (3 & 6) are used for Voice line 2 and the remaining pins 4,5,7 & 8 can transport native 802.3af PoE or are unused. Quad LAN RJ-45 10/100 autosensing ports allow the use of LAN devices without adding an Ethernet hub or switch to either end.

Installers have the convenience of a 100Mbps LAN Ethernet unit for peace of mind connectivity and no device maintenance. Rapid installation allows for minimal interruption and the Broadband technology allows for investment protection up to 10 -15 years with no firmware or replacement issues. Bandwidth can be scaled according to the Broadband Access Provider needs. The 864 Extended Ethernet Unit is a passive device so interruption of Internet service does not affect POTS services. Carriers and Access Providers can came and go, but the 864 Extended Ethernet Unit technologies continue to provide lasting value such as the other utilities like Water, gas and electricity.

The Enable-IT 864 Extended Ethernet Unit is suited for the following key environments:

- **Commercial Buildings (Multi-Tenant Units)**
- **Business Parks (Multi-Tenant Units)**
- **Apartments (Multi-Residential Units)**
- **Hotels (Multi-Hospitality Units)**
- **Business Suites (Multi-Hospitality Units)**
- **School Campuses (University, K-12)**
- **College Housing (Multi-Residential Units)**
- **Mining Operations – Quarries, Mine shafts**
- **Nautical Infrastructure – Cruise ships, Marinas, dive operations, subs**
- **Video Surveillance/Security**
- **WiFi Deployment – ISP's, RV Parks, Construction sites**
- **Manufacturing – Foundries, pharmaceutical, aerospace, automotive, petroleum, concrete plants, etc.**
- **Retail POS – Department stores, Bars, restaurants, retail spaces**
- **Government – Naval ships, FEMA, Housing, USGS, National Parks, Forestry, Research stations, NASA, utilities, etc.**
- **Education – outdoor camps, college campuses**
- **Healthcare – Hospitals, elder care, outpatient facilities**
- **Entertainment – Movie theaters, home entertainment, fairs, outdoor venues**

INSTALLING THE 864 EXTENDED ETHERNET DSLAM

The Enable-IT 864 Extended Ethernet Units have a distance restriction of 6,000ft or 1,828m over 1-pair of Category 2 up to Category 5e / CAT6 wiring from device extension to device extension. Therefore quick, simple site surveys and installation planning are highly recommended.

This chapter describes the recommended installation process for the Enable-IT 864 Extended Ethernet Unit. It covers the following topics:

- Site Plan – Installation Design Considerations
- Unpacking the Enable-IT 864 Extended Ethernet DSLAMs
- Perform an out of the box Test
- Performing the On-Site Installation

Site Plan - Installation Design Considerations

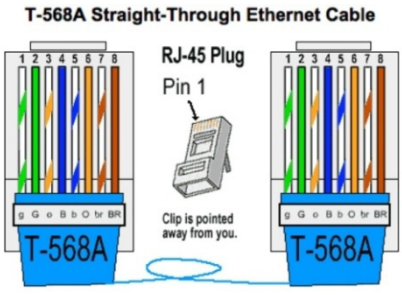
The planning process should involve a site walkthrough and discovery survey. Electrical Cable measurement tools are the most reliable method to determine the longest run of hidden wiring. Estimate the best locations to position the Broadband Concentrators to adequately reach desired connectivity on each floor. Document your findings to use in designing a network topology to support the Ethernet Switches and backbone connectivity. Key points to remember in the Site Survey.

- Total distance limitation of 6,000ft or 1,829m from end to end.
- 1 Pair CAT-2 wiring or 4-pair Cat5e .30 Gage or better cabling is required for the 864 Interlink transmission.

For the Interlink wiring you can use RJ-45 connectors. Crimp a RJ-45 Male Head to each end of the contiguous wire run and using the following pins (1 & 2) straight through. This will deliver Ethernet Data.

The 864 Interlink port (RJ-45 interface) carries this 1-pair signaling over the RJ-45 pins (1 & 2) - used for transport for both voice and data. If you use more than 1-pair of wiring such as a CAT5 segment, the RJ-45 pins (3 & 6) are not used and the remaining pins 4,5,7 & 8 are can transport native PoE or are unused.

864 CO



862 PRO CPE

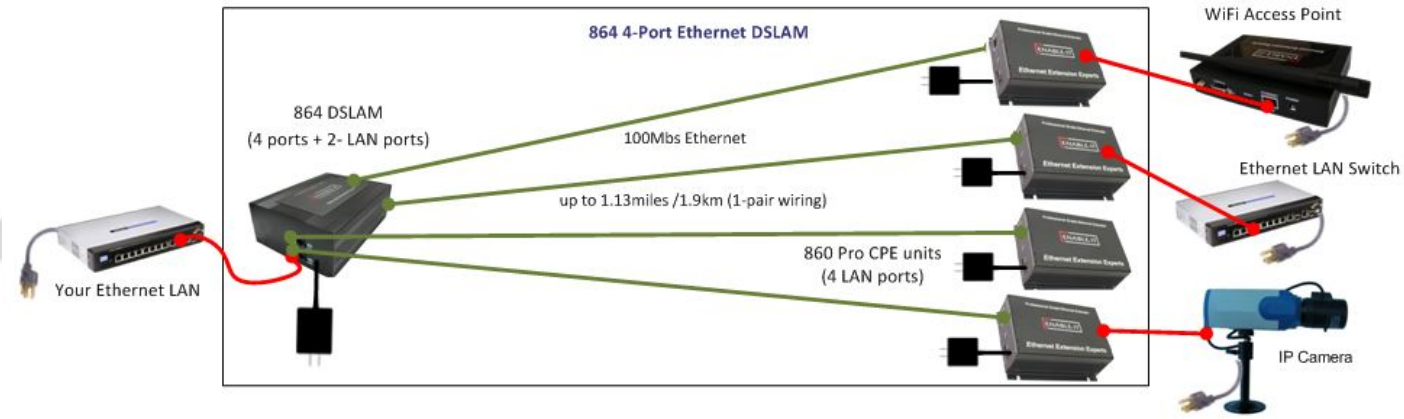
Unpacking the Enable-IT 864 Extended Ethernet DSLAM

Carefully remove the Enable-IT 864 Extended Ethernet DSLAMs all packing materials from the box. Verify that the items listed below are present. Make sure that the equipment supplied matches what you ordered. If any items are missing or damaged, please contact Enable-IT or your distributor for assistance.

- (2) The Enable-IT 864 Extended Ethernet Units (CO & CPE)
  - 12v AC/DC Country Specific Power adapter
  - 10' Black Ethernet LAN patch cables
- (1) Enable-IT 864 Extended Ethernet DSLAM User Manual (this manual)

Perform an out of the box Test

We highly recommend a quick test to ensure the working order of you 864 unit. To do this, please use one of the Ethernet patch cords provided and attach to the 864 Interlink port to each 860 CPE unit. Power up both the 864 and the 860 CPE units. The Green Sync LEDs will start flickering slowly and then fast as the units talk to each other. After a few seconds you should see a solid Green Interlink Sync LED on each unit to confirm a link is established. This confirms basic proper operation of the units. Next for a more detailed test and to confirm your LAN Equipment works with the 864, connect your Ethernet LAN to the 864 LAN ports and your Ethernet LAN at the remote CPE end and test connectivity. The Green Interlink Sync LED will pulse rapidly as it detects traffic.



LED indicators will provide visual operational status of the 864 units.

Sync - Slow to fast flicker on power up – indicates negotiation of a link.
Solid Green LED indicates link established and rapid pulse is traffic.
Pwr - Solid Green LED indicates that both units are receiving 12v power.
Mode - Solid Yellow LED on CPE unit only – No LED lit on CO
ACT - Yellow LEDs – Lit solid indicates the presence of local LAN
– Blinking indicates the presence of local LAN traffic

Performing the On-Site Installation

After removing the Enable-IT 864 Extended Ethernet DSLAM from the box and performing the out of the box testing all that remains to install the unit on-site is to mount the unit, build the interconnect wiring, add voice lines if needed and attach the LAN device cabling with the provided Ethernet Patch cords.

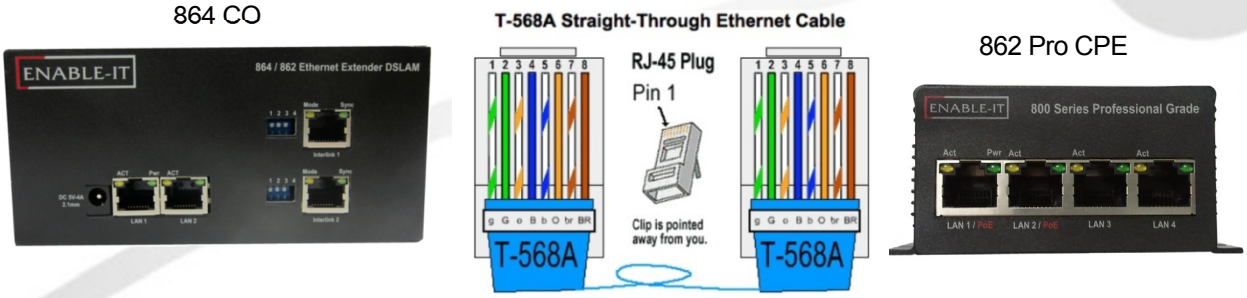
❶ Mounting the Enable-IT 862 CPE Extended Ethernet Units

The Enable-IT 862 Extended Ethernet CPE's are designed for quick wall mounting. Choose a location to mount each of the Enable-IT 860's where the maximum distance does not exceed 6,000ft or 1,829m total between devices to be connected. When wall-mounting the Enable-IT 862 Extended Ethernet CPE's it is recommended that you use the appropriate screw anchors for your mounting surface. If mounting on existing plywood use wood screws; if mounting onto drywall or sheetrock, use plastic drywall anchors to secure your installation.

❷ Building the 864 Interlink wiring

The most important aspect of the install is the correct wiring of the Interlink cabling. For the Interlink wiring you can use RJ-45 connectors. Crimp a RJ-45 Male Head to each end of the contiguous wire run and using the following pins (1 & 2) straight through. This will deliver Ethernet Data.

The 864 Interlink port (RJ-45 interface) carries this 1-pair signaling over the RJ-45 pins (1 & 2) - used for transport for both voice and data. If you use more than 1-pair of wiring such as a CAT5 segment, the RJ-45 pins (3 & 6) are not used and the remaining pins 4,5,7 & 8 are can transport native PoE or are unused.



❸ Attaching cabling and devices to the Enable-IT 864 Extended Ethernet DSLAM. Attach your remote LAN device to the 860 CPE unit LAN ports with Ethernet patch cord provided. Attach your local LAN to the 864 DSLAM LAN ports with Ethernet patch cord provided. Attach the power adapters to both the 864 DSLAM and 862 CPE units. Your equipment should now be powered up and functioning.

LED indicators will provide visual operational status of the 864 and 860 CPE units.

Sync - Slow to fast flicker on power up – indicates negotiation of a link.
Solid Green LED indicates link established and rapid pulse is traffic.
Pwr - Solid Green LED indicates that both units are receiving 12v power.
Mode - Solid Yellow LED on CPE unit only – No LED lit on CO
ACT - Yellow LEDs – Lit solid indicates the presence of local LAN
– Blinking indicates the presence of local LAN traffic

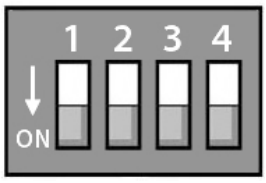
❹ For troubleshooting, first examine the backbone wiring pair and make sure you have solid connections. The Interlink Sync LED will be lit solid Green with rapid pulsing on each 864 unit to show proper connection and pairing. If the Interlink Sync LED Link is flashing slow to fast and never goes solid …. Then follow the steps below:

1) Make sure your wiring is straight through and not connected to any Telco punch down block; If so remove from the block and use Telco butt clips to bridge wire.

2) Check for a firm connection of the RJ-45 connections in each 864 unit, and power is applied to the 864 DSLAM& 860 CPE units.

3) You can easily isolate any issue by performing an out of the box test confirm either the 864 Kit or your wiring. It is possible an outside interference has been introduced into your wiring.

Performance Settings



If you are experiencing performance issues with your Ethernet connection you may use the following Dip switch settings to adjust your application. For Dip switch 2-4 you must toggle both symmetrically, in other words the CO and CPE must match. If you turn 3 up on the CO you must do so for the CPE and vice-versa.

- Dip Switch 1: Toggles the 860 Pro for either CO or CPE mode. (CO mode Up, CPE mode Down)

- Dip Switch 2: This toggles your 860 Pro for either Interleave or Fast mode – Default setting is set to Fast which is preferred for streaming multimedia, where an occasional dropped bit is acceptable, but lags are less so. Interleave channel works better for file transfers, where the delivered data must be error free but latency incurred by the retransmission of errored packets is acceptable.

- Dip Switch 3: This toggles symmetrical/asymmetrical mode for dsl transmissions. Symmetrical balances out the download/upload speed for transmitting data packets.

  Asymmetrical mode weighs in favor of download speed while sacrificing upload speed bandwidth. We suggest flipping Dip switch 3 Up (OFF) at a distance of 1,500 feet or less.

- Dip Switch 4: This toggles the Signal Noise Ratio (SNR). Default is set to 9dB which is excellent for long distance communications whereas flipping the switch Up (OFF) toggles 6dB mode. If you experience issues of noise bleeding over the lines or high interference in your environment it is suggested that you switch to 6dB mode and change to interleave mode. This will help clean up any noise bleeding over your cabling.

TECHNICAL SUPPORT

Enable-IT, Inc.'s Customer Care Team support is available directly to customers and distributors. All support requests are processed through the online support portal. This allows us to provide assigned support ticket numbers in order to bring closure to any technical issues.

Online Technical Services

The Enable-IT Support Portal is available 24/7 to open a ticket or check the status of one. Please use this support website as your first source for help as it contains an on-line knowledge base of articles, documentation, FAQ's and other problem-solving resources. This web-based support resource provides the quickest solution to the most common technical support issues.

World Wide Web Site

http://support.enableit.com

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Enable-IT, Inc. warrants to the original purchaser of the Product ("you" or the "End User") that, for the four (4) year period commencing on the date the Product was purchased (the "Warranty Period"), the Product will be substantially free from defects in materials and workmanship under normal use and conditions. **Electrical damage is not an item that is covered under this warranty, extended warranties or Advanced Replacement Program (AREP).**

In order to obtain an authorized RMA approval, the End User must complete the required information online located at http://support.enableit.com. If you have questions or difficulty completing this information you may contact the Customer Care Team at 888-309-0910 between the hours of 8:00 a.m. and 5:00 p.m. PT.

Please ship Authorized RMAs to:

Enable-IT Processing Facility
16600 Harbor Blvd, Suite I
Fountain Valley, CA 92708-1363

Returning Products for Refund

Enable-IT, Inc. offers a generous 45-Day refund on a single Ethernet Extender Kit only, and is subject to a 15% Restocking Fee. Shipments without a valid or authorized RMA number, or sent to our corporate Las Vegas address, can be refused and / or billed for additional shipping.

Enable-IT, Inc. warrants the Enable-IT 860 Pro Ethernet Extender Kit solely pursuant to the following terms and conditions.

1. PRODUCT WARRANTY.

a. Express Warranty.

Enable-IT warrants to the original purchaser of the Product ("you" or the "End User") that, for the four (4) year period commencing on the date the Product was purchased (the "Warranty Period"), the Product will be substantially free from defects in materials and workmanship under normal use and conditions. This warranty does not apply to Products, which are resold as used, repaired or reconditioned, or consumables (such as batteries) supplied with the Product. **Electrical damage is not an item that is covered under this warranty or extended warranties.** Enable-IT does not make any warranty with respect to any third party product, software or accessory supplied with or used in connection with the Product and such third party products, software and accessories, if any, are provided "AS IS." Warranty claims related to such third party products, software and accessories must be made to the applicable third party manufacturer.

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d. Voiding of Warranty.

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